4.4 (Continued) (pp 68 - 71).

7) \( h(x) = \frac{-32x^2 + x + 140}{(55)} \)

Store the values of \( a \), \( b \), and \( c \) in your graphing calculator.

241, 1, 3, 1, 2

\( \begin{align*}
& \text{\textbf{Alpha}} \quad \text{\textbf{Math}} \quad \text{\textbf{Apps}} \quad \text{\textbf{Enter}} \\
& \text{\textbf{Prgm}} \end{align*} \)

\( x \) - horizontal distance

"hits the water" height \( h(x) \) equals 0

\[ 0 = \frac{-32x^2 + x + 140}{(55)} \]

\[ a = \quad b = \quad c = \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]
4.4 (Continued)  (pp 68 - 71).

7. \( h(x) = -\frac{32x^2}{(55)^2} + x + 90 \).

Store the values of \( a \), \( b \), and \( c \) in your graphing calculator.

Clear your calculator memory.

4, 10, 10, 10, 2

\( a \rightarrow 5:0 \)  Alpha Math enter

\( b \rightarrow \)  prgm

\( c \rightarrow \)

\( -\text{horizontal distance} \)

"\( h \) is the water" height \( h(x) \) equals 0

\( 0 = -\frac{32x^2}{(55)^2} + x + 10 \) -> Quadratic formula.

\( a = \quad b = \quad c = \)

\( x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \)
* with the + sign
  \[ x \approx -95 \text{ feet} \rightarrow \text{the distance can't be negative.} \]

(Extraneous solution)

- with the (-) sign
  \[ x \approx 189 \text{ feet} \]

d) Use a graphing utility
\[ \text{by } [-10, 240] \]
\[ x \text{-values} \quad y \text{-values} \]
\[ X_{sc} = 20 \quad Y_{sc} = 50 \]

e) height = 100 feet, how far is it from the cliff?
\[ y_2 = 100 \]
Find the intersection,
\[ 2^{\text{nd}} \text{Trace} \quad 5 \quad \text{first curve.} \quad 2^{\text{nd}} \text{curve} \]
Guess \( \star \)
\[ (151, 100) \]
\[ x = 151 \text{ feet far from the cliff} \]

2.63 Build Quadratic Models from verbal descriptions

4) \[ x = -8p + 176 \]
9) Revenue \( R \) as a function of \( x \) variable 1 as a function of variable 2.
\[ R = x \]
\[ \text{Get the } p \text{ out of here} \]
\[ x = -8p + 176 \]

\[ x - 176 = -8p \]

\[ x = \frac{-8p}{8} \]

\[ \frac{-x + 22}{8} \] or \[ \frac{-1x + 22}{8} \]

\[ x \text{ separated from the fraction} \]

\[ R = x \left( -\frac{1}{8}x + 22 \right) \rightarrow \text{step 1} \]

Step 2 \( \rightarrow \) already solved

\[ R = -\frac{1}{8}x^2 + 22x \]

Step 3 = \[ R(x) = -\frac{1}{8}x^2 + 22x \]

b) Implied Domain:

Smallest \( x \) quantity sold = 0.
Largest \( x \) quantity sold = make the price free \( p = 0 \).

\[ x = -8p + 176 \]

\[ x = -8(0) + 176 \]

\[ x = 176 \rightarrow \text{largest } x \]

Domain: \([0, 176]\)
c) Revenue if 144 units are sold:

\[ X = 144. \]

\[ R(144) = -\frac{1}{8} \cdot (144)^2 + 22 \cdot (144). \]

\[ R(144) = \$576.00. \]

d) What maximizes the revenue?

Vertex of the quadratic function:

\[ R(x) = -\frac{1}{8} \cdot x^2 + 22 \cdot x \]

\[ \left( \frac{-b}{2a}, \frac{c-b^2}{4a} \right) \]

\[ a = -\frac{1}{8}, \quad b = 22, \quad c = 0. \]

\[ \left( 88, \frac{968}{8} \right) \]

\[ \frac{968}{88} = p \]

\[ p = \$11 \]

When 88 units are sold, the maximum revenue is \$968.00.

e) What price should the company charge to maximize revenue?

\[ P = x \cdot P \]

\[ 968 = 88 \cdot p \]

\[ \frac{968}{88} = p \]

\[ p = \$11 \]
What price should the company charge to earn at least $840 in revenue?

\[ R(x) = -\frac{1}{8}x^2 + 22x \]

\[ 840 = -\frac{1}{8}x^2 + 22x \]

\[ 0 = -\frac{1}{8}x^2 + 22x - 840 \]

Quadratic formula: \( a = -\frac{1}{8}, \ b = 22, \ c = -840 \).

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{-b + \sqrt{b^2 - 4ac}}{2a} = 56 \quad \text{or} \quad x = 120 \]

\[ R = xy \]

\[ R = 840 \]

\[ 840 = 56p \quad \text{or} \quad 840 = 120p \]

\[ p = \$15 \quad \text{or} \quad p = \$3 \]

If the price is between $7 and $15, the revenue will be at least $840 or $800.
When working with rectangles:

Area: \( A = \text{w} \times \text{l} \)

Perimeter: \( P = 2\text{l} + 2\text{w} \)

280 yards of fencing.

Variable 1: \( \text{w} \)

Variable 2: \( \text{l} \)

a) big blue box

\[ A = \text{l} \times \text{w} \]

\[ P = 280 \]

\[ \frac{280}{2} = \text{l} \]

\[ \frac{280}{2\text{w}} = \text{l} \]

\[ \frac{140}{\text{w}} = \text{l} \]

Step 2

\[ A = (140 - \text{w}) \times \text{w} \]

Step 3

\[ A = -\text{w}^2 + 140\text{w} \]

\[ A(\text{w}) = -\text{w}^2 + 140\text{w} \] (quadratic)

b) for what value of \( \text{w} \) is the area the largest?

What is the maximum area?

\[ \text{Area is squared units} \]

C) vertex

\( a = -1 \)

\( b = 140 \)

\( c = 0 \)

\[ \frac{-b}{2a} \]

\[ C = \frac{-140}{2(-1)} \]

\[ (x, y) \]

\( x = 70 \text{ yards} \)

\( y = 4900 \text{ yards}^2 \)

\[ \text{w} \]

\[ A(\text{w}) \]